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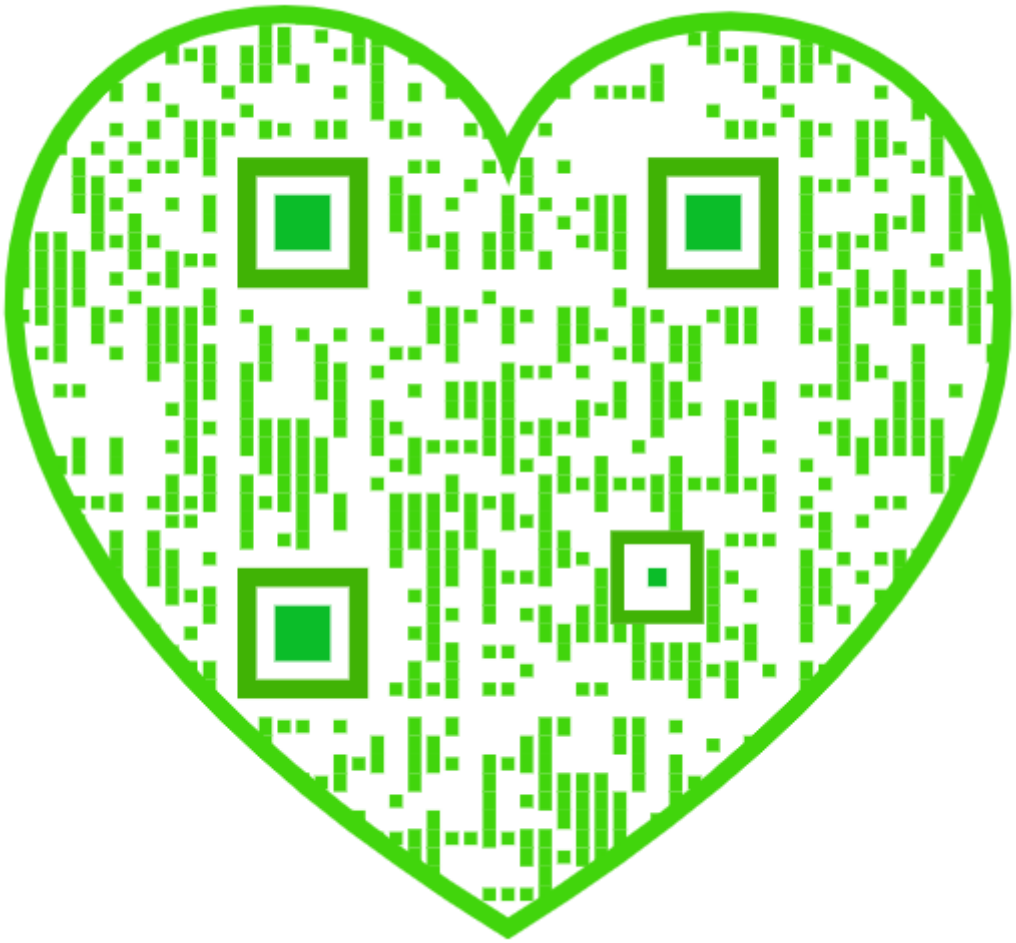
FRET-SAWING

WOOD CARVING



FRET-SAWING

AND

WOOD-CARVING

FOR AMATEURS.

BY

GEORGE A. SAWYER.

Illustrated from Original Drawings by the Author.

"Carved with figures strange and sweet,
All made out of the carver's brain."
SAM'L T. COLERIDGE.

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PREFACE.

THE writer contributed, during the past year, a series of articles on wood-carving to that most delightful of young folks' magazines, Scribner's "St. Nicholas."

The unexpected interest displayed in them, and the many questions asked not only by friends, but by unknown correspondents, encourage the hope that a more complete description of the tools and mode of work might not be unacceptable; and it is with this thought that this little bark is launched upon the sea of books.

Whatever the shortcomings or the merits of its cargo, it is freighted with the desire to carry its burden into many a happy port, and leave nothing but that which is healthful and helpful in its results.

Especially is it consigned to the restless energies of the younger members of the household, in the hope that its course may direct them in channels where their labors will not be entirely lost, and where the time pleasantly passed in becoming familiar with even these simple tools and their uses, may in after life become valuable.

G. A. S.

GERMANTOWN, PHILA., PA.

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FRET-SAWING AND WOOD-CARVING FOR AMATEURS.

Introduction.

FRET-SAWING has, within a few years past, jumped into a popularity rather hard to realize by those who are not within the pale of its fascinations; but it is a fact that to-day it is one of the most popular of home amusements. Within many a pleasant home is heard the gentle z-z-z of the handsaw, or the more sonorous buzz of the jig-machine; and walls and tables everywhere are loaded with the results of these labors. Good, bad, and indifferent, large and small, dark and light, brackets, easels, book-racks, picture-frames, and other things too numerous to mention, — the houses and shops are alike full of them, and still they come. A good deal of this enthusiasm is spasmodic, and will die out; but there yet remains a large amount of solid interest to be provided for.

The true secret of this suddenly acquired popularity lies in the fact that this amusement is within the reach of almost every

one, that it is easily acquired, costs but little, and is really productive of good results. It keeps us happily busy, gives us a resource for rainy days, and helps us recall ourselves pleasantly to the remembrance of those friends, whom we gratify by thinking of them while we make some pretty little object to adorn their rooms.

For the young particularly, this is a most desirable pursuit. Its influences are alone for good, its associations solely refining and elevating. It does not take them to improper places, nor bring them in contact with doubtful characters. It cultivates their taste for the mechanical arts; it makes them handy and helpful in the use of the tools; it tends to develop any talent they may have for drawing and designing; and it may become a means of future profit as well as present pleasure.

For the older members of the family, too, it has its charms. We can buy brackets, boxes, portfolios, and a thousand other things, cheaper perhaps, and more finely executed, than we are ever likely to produce them; but who can estimate the pleasure derived from the gift of an article done by some dear hand? Slippers are all well enough in their way, but the most carefully kept ones will not wear forever. A handkerchief, with our monogram prettily wrought, makes a very tender souvenir; but they are apt to get "blown off the line, sur," and disappear. Neckties are charming, but fleeting; even the bright colors of a pincushion fade, and the stitches fray with constant use. When, however, John gives Jane a rosewood box with her

monogram inlaid in the top, and all sorts of convenient little trays inside for her jewels or her spools; or Jane gives John her portrait in a frame of her own sawing and carving, — we feel reasonably sure that the gift will last for many a long year to recall us, in pleasant memories, and that time will only add to its beauties by mellowing its tints and harmonizing its tones.

Let us, then, gather up our tools, lay in a stock of beautiful and enduring wood, and prepare ourselves to become skilled workmen in this pleasant field.

I.

Tools and Accessories for Fret-Sawing.

THIS little work aims to be entirely practical in its character; and, as it may fall into the hands of those away from the cities where opportunities exist for personal examination and inquiry, the approximate cost of the different articles is given; and, when necessary, more than one kind of tool is described, so that an intelligent selection may be made. Of course there are many kinds of tools, not mentioned here, which would be very useful to possess; and there are other methods of work besides those described; but the writer usually offers only those which his own experience has proved satisfactory, and which will repay trial.

For simple fret-sawing, the tools required are few and inexpensive.

Pretty good work can be done by a clever boy with only a jack-knife and an old cigar-box; indeed, we have toiled away with nothing more than these for months at a time; but a few cheap tools enlarge one's field as a lens does one's vision, and are greatly to be desired.

As a commencement, something like the following might be suggested: —

A saw-frame with a dozen fret-saws; an awl with which to drill holes; a few small files to finish the work, and smooth down inequalities left by the saw; a pocket-knife of almost any pattern; and two or three sheets of sandpaper, — the whole costing between two and three dollars. If you add to these a handle of tools, which includes the awl before mentioned, and has, besides, some chisels and other useful implements; and an oil-stone for sharpening your knife and other edged tools; a glue-pot to mend broken parts, and fasten others; a bottle of linseed-oil or shellac-varnish for polishing finished work, — the additional lot costing perhaps two dollars more, — you will have an outfit equal to almost any ordinary demands. If to these you add a small plane, a drill of some kind with a number of drills of different sizes, and a set of small carving-tools, the whole costing about five or six dollars, you have a complete equipment; and there is nothing more to wish for except a saw running by foot-power like a sewing-machine. Without this last, however, you can do excellent and finished work. The treadle-saw will only do it a good deal faster, and with less fatigue, just as the sewing-machine accomplishes work so much faster than the unaided hand; but there is perhaps the same temptation to elaborate and multiply work with the treadle-machine, that there is to add tucks and frills when one uses a sewing-machine; it seems so easy to do, and is so quickly done.

Let us recapitulate.

List of tools which are essential for fret-sawing:—

A saw-frame,
A dozen assorted saws,
An awl to bore holes,
Half a dozen files,
A few sheets of sand or glass paper.

List of additional tools which it is convenient to possess, and which may be purchased at once if possible:—

Handle of tools,
Oil-stone,
Glue-pot,
Two or three wooden screw-clamps for holding glued objects,
Bottle of oil or varnish,
Archimedian drill with six small drills.

With these to commence with, you can do any of the ordinary samples of fret-sawing with satisfaction and success; and if you are only taking up the occupation for a temporary purpose, or as a means of whiling away some spare moments which would otherwise hang heavily, and not from any real fondness for mechanical pursuits, we would advise your being content with these.

For those, however, who have had previous experience, or

for people of strong mechanical tastes and some leisure, we would recommend extending the list by the addition of one of the several kinds of treadle scroll-sawing machines with which the market is abundantly supplied, and which can be procured at prices ranging all the way from ten dollars to one hundred and fifty. Without venturing to discriminate between the different rivals for public favor, it is suggested that there are a few points which it is necessary that the machine should fulfil. It should be well and strongly made, and yet not too heavy to be portable. It should be symmetrical and graceful. The fewer the parts, and the simpler its formation, the better ; and it should be readily adjustable to carry saws of different sizes and lengths ; and, lastly, it should run with great rapidity and ease. The machine that will fill these requirements, and still come within the reach of the average pockets of the people, will soon make its way.*

A small smoothing-plane such as piano-makers use,
A light hammer,
A try-square,
A gauge,

may be added as they are needed, and will be found indispensable to the advanced workman who intends to excel.

* The "Fleetwood" Machine, which we use, is to us entirely satisfactory, and is furnished at a less price than any other with which we are acquainted. The older ones were made with a treadle for one foot. We regard the double-foot treadle as an essential improvement.

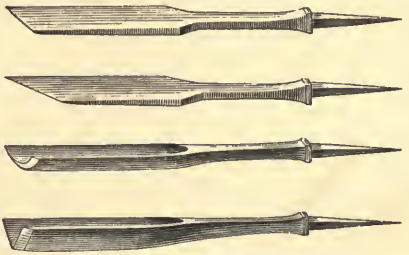
II.

Tools and Accessories for Carving.

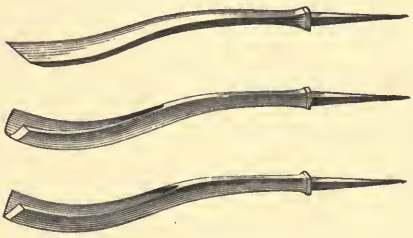
THOUGH good specimens of fret-sawing, well and carefully finished, are pleasing, and to many satisfactory, the rich effect of the sawing is greatly heightened, in an artistic point of view, by calling to our aid the chisels and gouges of the carver; and here there is no limit to our fancy, and there is an opportunity to display all the ability and power we possess. A dozen people will take the same design, and with a fret-saw cut out the pattern in very much the same style; they have a line to follow; and except that one will do it smoothly, and one roughly, the general effect will be at last much the same; but, put the carver's tools into their hands, and the same specimens when finished will vary all the way from bad to something which would be acceptable as a work of fine art. Next to drawing and painting, there is nothing which more readily shows the refinement of taste and feeling, and the education of the hand and eye, than the few strokes with which a flower or a leaf is cut out of a solid block of wood; and the number of successful wood-carvers should be as much greater

PLATE I.—For description see "Tools for Carving."

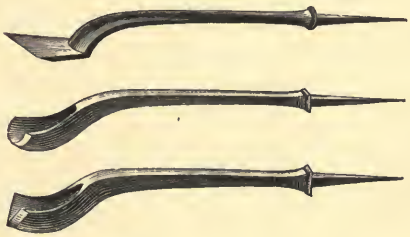
STRAIGHT CARVING TOOLS.



BENT CARVING TOOLS.

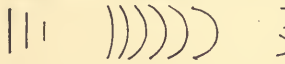


FRONT BENT CARVING TOOLS.



IMPRESSIONS OF THE EDGES OF TOOLS.

Chisels. Gouges.



than the number of successful artists, as excellence in the one pursuit is the more easily acquired than in the other.

The tools required for carving work previously prepared by the fret-saw need not be numerous or expensive, though there are more difficulties in the way of making a proper selection here than in the case of the fret-sawing appliances. We cannot help detailing our own experience.

Some time after making our first essay at real carving on a small piece of work, on which we used the chisels and gouges which came with the little handle of tools previously mentioned, to which we had added one or two of our own home manufacture, we one day went into a large hardware establishment, and asked to see some wood-carving tools. The clerk conducted us to the rear of the shop, and, going up to a long counter, threw open two large drawers, and asked what we wished. We replied that we were only an amateur, and had come to see what they had, and what one needed in the way of a small set for general work. The gentleman smiled when he said, "We have here chisels and gouges of eight or nine different patterns and shapes, commencing at one-sixteenth of an inch wide, and increasing by sixteenths up to two inches, or more, — probably in all one hundred and fifty tools; and we don't pretend to know any thing about them. Usually workmen come in with the sizes and shapes they need punched on a piece of board, and they make their selection to suit their particular work; and every man wants a different lot. We can give no advice."

After looking them all over, we retired in despair, and concluded to go into the workshops, and see what the men who used them had to say about it. Here we were more successful; and from them, and other sources of information, we decided that a dozen or eighteen of the sizes under one half inch would suit the particular work for which we wished them. These tools, however, are all large, and to a certain extent awkward; that is, they are designed to stand the ordinary rough usage of the workshop, and in so far are not adapted to the more careful handling of the amateur, particularly when the amateur is a lady; and so we made a pattern; and, after some trouble to find a skilful and willing workman, we had a set made to our entire satisfaction after our own designs.

For ordinary work, however, the tools imported from England (we cannot find that there is any manufactory of them in this country), and kept in the large tool-stores, cannot be excelled; and the prices range from thirty-five to seventy-five cents apiece for the sizes under one half-inch.

We will give a select list of one dozen, and of eighteen for general work, such as has been described. Those who want to do heavier work, or wish to extend the range of it, can add other tools, or, rather, different sizes of these same ones, as they find out their needs. It is suggested that no more tools be gotten to commence with than are necessary to make a fair start, but the collection extended as experience calls for them.

List of tools for carving:—

3 flat chisels,

1 . . . $\frac{1}{2}$ inch wide,

1 . . . $\frac{5}{16}$ " "

1 . . . $\frac{1}{8}$ " "

3 shallow gouges,

1 . . . $\frac{1}{2}$ inch wide,

1 . . . $\frac{5}{16}$ " "

1 . . . $\frac{1}{8}$ " "

3 deep gouges,

1 . . . $\frac{1}{2}$ inch wide,

1 . . . $\frac{3}{8}$ " "

1 . . . $\frac{1}{4}$ " "

1 skew chisel, $\frac{1}{4}$ inch wide,

1 parting-tool, $\frac{3}{16}$ " "

1 fluting-gouge, $\frac{1}{8}$ " "

The above are all *straight* tools.

When the paragraph above was written, we intended to extend the list by six more tools. But we find that, after getting beyond those already mentioned, generalization becomes more difficult; and instead we have added figures of the bent tools (see plate of carving-tools), from which each can make selections suitable for the work in hand, or to suit particular needs. We will only say that the bent parting-tool, and bent fluting-gouge, are very generally useful. They are the same sizes as

the straight ones, and differ only in the curve of the blade, which permits their use in depressions of the work where a straight tool will not reach.

There is another tool of which we have not given a figure, but often noticed in the books, called a macaroni, — a round name for a square thing, it being a flat chisel with the edges turned up, and would make an impression like this ⌊___⌋. It is chiefly useful in cutting away the waste wood next the prominent veins of foliage; but the parting-tool and a flat chisel accomplish the same work, and the macaroni is extremely difficult to sharpen, and keep in order.

The other bent tools are more valuable on work of greater depth than any we are likely to have in connection with fret-sawing; but where they are needed they are indispensable. Where it is intended to have the carved work raised on a level ground, a pick or checkering punch is useful in breaking up the flat surface. This effect may often be seen on what are called stencilled picture-frames so popular two or three years ago.

Diaper-carving is another name for a very similar kind of work. The outlines of the design are carved with a parting-tool or the graver of the wood-engraver; and all the wood outside of the figure is stamped with a checkering punch.

All parts of this work, it will be seen, are on the same level; and the effect is entirely dependent upon the contrast between the smooth parts of the design, and the stamping of the ground-work. A pattern with broad lines, after the style of plate 2,

would be of suitable character for this kind of work; and a small box, or the cover to a book, would be an appropriate example.

The checkering punch may have one point, thus, ▪, or three, ⁘, or four, ⁙, or like an asterisk *, or a variety of other shapes; and the amateur can make them himself by taking a piece of round or square steel-wire four inches long, and three-sixteenths or a quarter of an inch in diameter, and filing one end into the desired shape.

After the carving is finished, one of these punches is taken, and the whole ground-work is covered with its figure indented by a light blow with the mallet, and the surface not regularly, that is, not in regular lines, but evenly pitted. The carved part, being left smooth and untouched, forms with this roughened surface a stronger contrast.

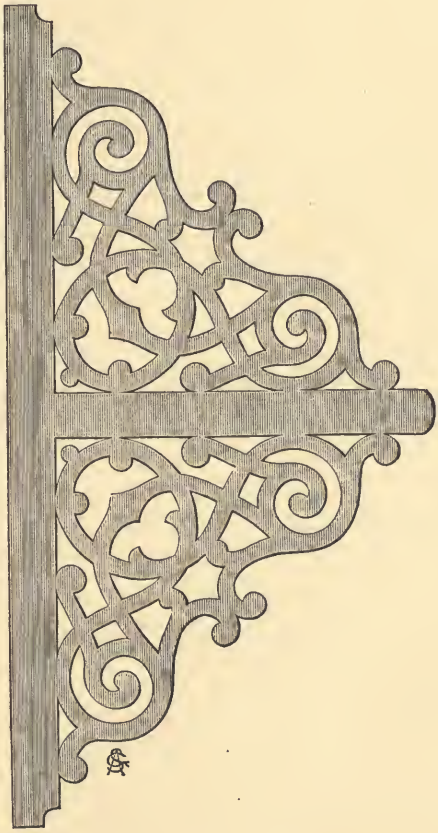
Besides the tools above mentioned, you will need one or two clamps, or hold-fasts, of which a good pattern is figured elsewhere, and a light wooden mallet, which can be procured in any hardware store; and one or two slips, as they are called, of Ouachita, or preferably of Arkansas oil-stone, to sharpen the inside of the gouges and parting-tools.

The tools of our own pattern, spoken of above, cost about fifteen dollars, with a single adjustable handle into which they all fitted. This was for one set very carefully made by hand; and the price was altogether too large to make them available for popular use. We are in hopes of being able to get

some more made in considerable numbers at a reasonable rate.

A set of carving tools by Addis, the celebrated London maker, would cost, for one dozen assorted, about thirty-five or forty cents apiece.

PLATE II.



CORNER BRACKET.

III.

Saw-Frames and Saws.

THERE are so many different patterns of saw-frames for sale, that we feel the importance of setting the tyro right in this matter upon which our success so greatly depends; and we therefore give a few brief remarks upon some of the kinds which have come under our notice.

The smallest, simplest, and handiest, of which we know any thing, is the one figured in No. 1, and is the one we would recommend to those without previous practice, and especially for children's use. It is also the cheapest, costing from one dollar to a dollar and a half, according to the make. The objection to it is, that only small work can be done with it, the distance from the saw-blade to the back of the frame, only about two and a half inches, being the limit.

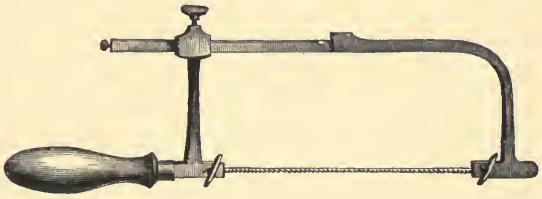


Fig. 1. Adjustable Saw-Frame.

These frames are all made abroad, and we do not know of any manufacturer of them in this country; but they are in great demand among artisans of different professions, and one advantage they have is that they can be obtained almost anywhere. They are sold under the various names of dentist's, or jeweller's, or mechanical saw-frames; and even if you subsequently treat yourself to a larger one, or to a treadle-machine, they will be useful for many purposes on account of their portability. This is also the only frame in which the back is adjustable to broken saws, or blades of varying lengths; and it possesses an additional value on that account.

The next pattern in point of size is something like figure No. 2, which is also much like the one we have just been describing except that it has no method of adjustment; an objection which applies to all the other patterns which will be mentioned. It will, however, do larger work, the distance from the saw-blade to the back varying in different makes from six to fourteen inches. For ordinary work one eight or nine inches is plenty large, and more easily managed than one larger; it being remembered, that, as you can saw that distance from each edge of your board, an eight-inch

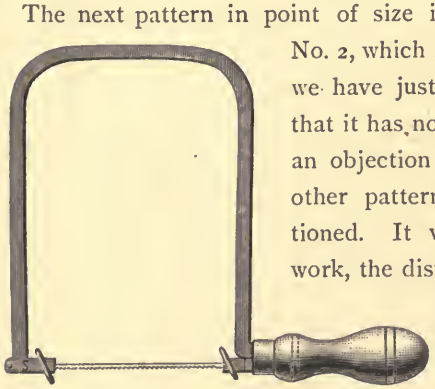


Fig. 2. Saw-Frame.

saw will cut satisfactorily on a board a foot or fourteen inches wide, and that is quite sufficient for any ordinary hand-work.

The next kind of saw-frames are varying styles of figure No. 3. We have never used one of these, and so do not speak from personal experience; but this pattern is the kind that has probably been most used by amateurs in this country, and in England, where fret-sawing is even more popular than here.

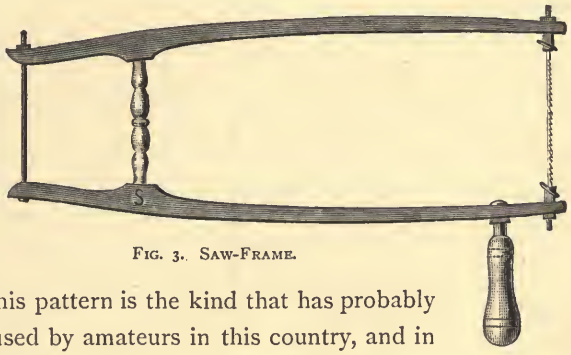


Fig. 3. Saw-Frame.

The long frame of this saw requires to be supported on the upper arm, and it would seem to be more fatiguing to use than some one of the smaller kinds. It should therefore be made as light and symmetrical as possible. But it does larger work, and the large opening saves trouble in having to turn the wood less frequently; and we know ladies use it with great success. In fact, the best specimens of hand fret-sawing we have yet seen were at the rooms of the Sorrento Wood-Carving Co. in Boston, where the walls were hung with the most beautiful work, all done, we were told, by the ladies of the establishment.

In figure No. 4 is a pattern of a saw-frame invented by a friend, which is too good to be kept longer restricted to the favored few; and the dimensions of one of good size are given, that any one with a few tools, and a slight mechanical turn of mind, may easily make for themselves, only having to get the clamps to take the ends of the saw-blades at any machine-shop.

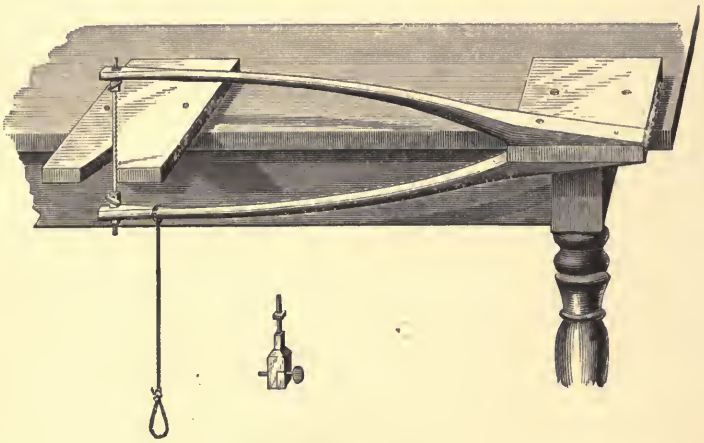


Fig. 4. Foot Jig-Saw.

The whole cost will not be greater than any of the larger styles last mentioned; and we think, where one has facilities for getting them made, that they will be found as useful, and as easily operated, as any saw not having a regular balanced movement like the treadle-machines. They are, however, less desirable for ladies' use.

The arms are thirty-six inches long, and made of black wal-

nut, one inch square. Seven inches from the end, the sticks are planed off to a taper, and left square. The rest of the arm is worked down to a long, graduated, elastic, round rod; the last two inches being square, and through which holes are bored to take the saw-clamps. These clamps are made like the figure, with a square shank to fit the hole in the arm, and a nut to screw down, and hold them fast; and a jaw, confined by a thumb-screw, in which to fasten the saw-blade. Screw the arms on a piece of inch board, six inches or so square; and this board, when using the saw, is fastened to a box or table by a clamp or screws. Fasten a wooden saw-horse, like the one figured elsewhere, on the table opposite the saw, the blade being close into the V cleft; and on this place the work. Be careful, when fastening the arms to the board, that the saw-blade is exactly perpendicular, so that, when it is drawn down by the action of the foot, the cut will be true. This is worked to the best advantage by a strap or stirrup from the lower arm, into which the heel of the boot is put, the ball of the foot resting on the floor; or, better, on a block of wood an inch or two high. The motion is less fatiguing than might be imagined, and can be kept up for a considerable period. This arrangement makes a cut at right angles to the surface of the wood, and it leaves both hands free to guide the work; advantages which go far to compensate for its disadvantages.

All the saw-blades for these frames are made abroad, in

Germany principally, and vary in size from one so fine that the teeth are not visible except upon very close examination, to one coarse enough to take one of the first kind between each of its teeth. They are numbered from 1 to 5; the No. 1's have about eighty teeth to the inch, and the No. 5's about thirty. There are still finer ones than these, numbered ooo, oo, and o, and are used for cutting metal. With a treadle-saw, thin brass, copper, silver, &c., may be sawed, and monograms, and other ornaments for inlaying or overlaying wood-work, may be executed very beautifully. Monograms done in ivory or French gilt, make handsome and appropriate adornments for a prayer-book or Bible.

The medium and coarse sizes, Nos. 3 to 5, are best for fret-sawing; and two dozen will last a long time. Being made by machinery, they are sold very cheaply, retailing in this country for twenty or thirty cents a dozen.

There are still coarser saw-blades made at home, and specially adapted to the particular machine for which they are designed; and, in using a treadle-machine for sawing any thing thicker than one-eighth of an inch, they are more useful than a finer one; also in preparing wood to be carved. The only ones we have used are made by the Trump Brothers, Wilmington, Del., and are excellent. They cost fifty cents a dozen.

All these smaller implements can safely be ordered and sent by mail; but, for the occasional workman who likes to make things for himself, we may mention that very good saw-blades

can be made from discarded hoop-skirt steel, cutting the teeth with a file. A number of pieces of the desired length may be fastened together by clamps, or hand-vises, at the ends, and the whole filed out at once with but little more labor than a single one would require.

IV.

Miscellaneous Tools.

THE handle of tools (see figure 5, which, however, shows only a portion of the tools), mentioned with the fret-sawing implements, is an extremely convenient article to have in the house, besides its usefulness in this particular direction. There are several kinds in the market; but this will be found to combine as many advantages, perhaps, as any of them. About twenty small tools, screw-drivers, countersink, chisels, awls, brads, &c., are included in the same handle, into which they all fit, and are

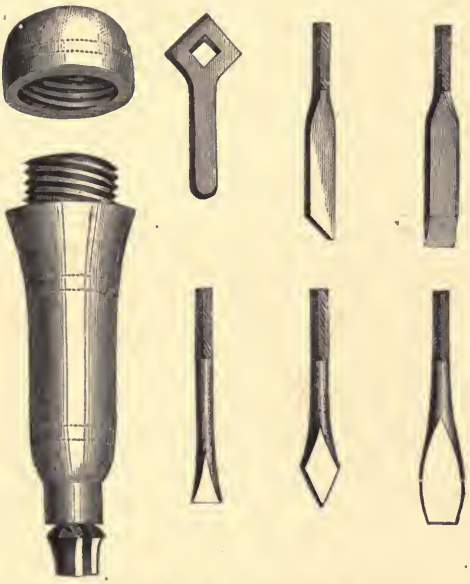


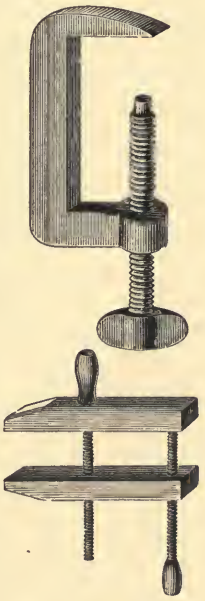
FIG. 5. BRAD-AWLS, &C., WITH HOLLOW HANDLE.

PLATE III.

WALL BRACKET.

securely held while in use. When not in use, the tools and wrench all go into the hollow handle, which thus occupies but little space, and can be sold at a most reasonable price. The cost of this style is about a dollar and a half, or less.

Figures 6 and 7 are given of two kinds of clamps. They are both useful in holding glued articles, and the metal one with the single screw for fastening wood to the bench while being carved.



FIGS. 6 AND 7. CLAMPS.

A convenient way of securing wood is to nail two thin strips on the work-bench at right angles to each other, and place the article in the angle. As the carving is done principally by pushing the tools, the strips make a point of support, and prevent the article from slipping away. When the edges of the work are delicately carved, it will not of course do to subject them to this pressure, and in that case the clamp may be used. The work may also be fastened by a screw, or screws, to a piece of board from the under side; the screws being put into the carving in the thickest part, and where they will not interfere with the use of the tools.

When carving fret-work after sawing, it may sometimes be best to put a long screw through a hole in the work-bench, or a good sized piece of board, pass the point of the screw through one of

the openings of the fret-work, and screw a wooden block on the point as a nut, and turn it down close enough to hold the work tightly.

Smaller pieces of wood to be carved may also be glued to a larger piece of pine board, and the latter fastened in any easy way. Put a piece of thin paper between the two glued articles, and, when it is desired to separate them, carefully insert the blade of a thin table-knife. The paper will split, and permit their parting.

Fig. 8. Drill.

The drill (No. 8) figured here is known as the Archimedian, and is as good as any we have yet seen. There are six sizes of drills furnished with the stock; and more may be added by getting the common twist-drills, and grinding the shanks to fit the stock. The twist-drills make a perfectly clean, clear hole, which can be used advantageously for ornamental purposes.

Some of the treadle-machines have drilling-attachments, which would supersede the use of the hand-drills.

A small plane has been mentioned as very convenient. The one we have in use is an implement made for piano-makers, and is a smoothing-plane of a little less than one-half the usual size, but costs full price, about a dollar and a half.

The figure (No. 9) of the saw-horse sufficiently explains itself. A piece of board has a V-shaped notch cut in one or both ends, two or three inches

deep. The horse is fastened to a table or work-bench, with the V end protecting over the edge, and the work is laid on it so that the saw when in operation will be close in the angle, and the horns of the horse on either side will support the wood.

Fig. 9. Saw-Horse.

In the list of fret-sawing tools, there are half a dozen files mentioned. While almost any kind will do, we have hit upon a style which is so much more convenient to use, and which works so satisfactorily, that we cannot forbear giving a figure (No. 10) and description of them. They are made of eighth-inch wire, two inches of the round wire being left on to serve as a handle. They can be bought by the dozen for about seventy-five cents, all kinds alike. A flat one, a round one, a half-flat and half-round, a square, a three-cornered, and a knife-edged, are the kinds recommended. For finishing fine work, these are indispensable. For large work, larger sizes of the flat, square, round, and round and flat, will be found useful. These cannot be gotten

Figs. 10 and 11. Files.

of the handled style; and any hardware store will supply them. Peter Stubs' files are the best in the world, and cost but little more than the commoner ones not half as good.

Another very useful file is shaped like fig. 11. They are called rifflers, or bent files, and are very desirable for smoothing the hollow surface of a leaf or petal of a flower after carving, and for other places where a piece of flat sand-paper would not reach. They can be procured at places where dental instruments are kept, and are sold for about twenty cents each. There are other shapes besides the one figured.

V.

Sharpening Tools.

ALL edge-tools require frequent sharpening. A dull tool makes hard and poor work, and is a constant aggravation. To keep them in order, an oil-stone must be always at hand, and often made use of. Ouachita-stones, three or four inches long and two or three wide, may be purchased for fifteen or twenty cents, and will serve a good purpose ; but the very best stones are Arkansas, which give the finest and most enduring edge. They are costly, but will last forever. One of the size mentioned above will cost nearly a dollar, and will be entirely satisfactory. They should be kept in a box to preserve them clean and free from dust and grit; and the amateur will take pleasure in making a box for this purpose himself of some pretty wood. Lay the stone down on a piece of

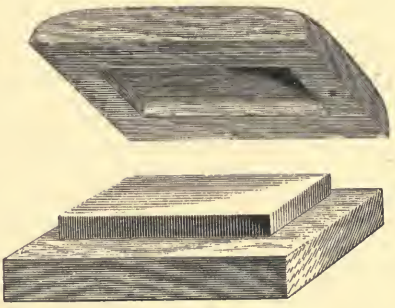


Fig. 12. Oil-Stone and Box.

wood a little larger than itself, and mark its outline on the surface, and then dig it out with a chisel to about half the depth of the stone. Repeat the same thing for a cover; place it on the stone, and plane all the edges of the box even. Give it two or three coats of shellac inside and out, and your stone is safe from dirt, and breakage from a chance fall. Besides the oil-stone, it is well to have a small block of wood, upon the top of which is glued a piece of soft, thick leather, moistened with oil, and sprinkled with fine emery-powder. This may have a cover also. Keep a little vial of sweet oil, neat's-foot, or even kerosene, always at hand. Put a few drops on the oil-stone, lay the bevelled or sloping edge of your chisels and gouges flat on the stone, holding them steadily with both hands, and not bearing too hard, and move them to and fro; being careful to slowly rock the gouges from side to side, so as to bring every part of their rounded edges successively to bear upon the stone. Try the edge occasionally by drawing it across a shaving, or piece of paper, and continue the whetting till it makes an even, clean, sharp cut. The other side of the chisel will need a few touches on the stone; and the inside of the gouges and parting-tool will require rubbing with a slip of Arkansas-stone ground to fit the curves and angles; the gouges being held in the left hand, and the slip applied with the right, taking care that the fingers are kept well back, and out of reach in case of a chance slip of the tool. After getting a satisfactory edge by the above means, draw the tools a few times over the leather and emery, and they

can be kept in good condition with but little trouble. Keep the edges of all tools protected from injury or rubbing against each other; and it is well to place them, after using, in a box or rack, where they will be safe. It is a comparatively easy thing to keep them in order, but a more difficult one to repair the effects of rough usage.

The oil-slip previously mentioned (see fig. 13) is a piece of stone about two inches long, and one wide, shaped like a thick knife-blade; the edge for whetting the inner angle of the parting-tool, and the thick rounded back for the inside of the gouges. It is still better if made tapering, the thin end for the small gouges, and the thick end for the large ones. They cost twenty-five or thirty cents.

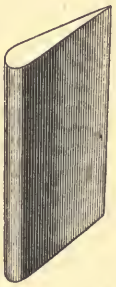


FIG. 13. OIL-SLIP.

VI.

Woods.

FOR fret-sawing and carving, the most desirable and easily procured wood is black walnut, sawed not more than one-fourth of an inch in thickness, and planed smooth on both sides. This wood is of universal popularity; and the ease with which it is worked, and its handsome dark color and beautiful grain, make it very suitable for all kinds of household adornment. It should cost about from six to ten cents per square foot, of the thickness named.

White holly is another very popular wood; but it is more difficult to procure, except in large towns where there is a demand for it for fret-sawing and carving purposes. When freshly cut, this wood has a light creamy tint, almost white in fact; and the grain is nearly as fine and close as ivory. If exposed to the air it gradually discolors, particularly in rooms where gas is burned; and it is well to give it a coat of bleached shellac if it is desirable to preserve the fresh white color. It makes a good contrast with black walnut, rosewood, or other dark woods; and work done in it, and glued on a dark back-

PLATE IV.

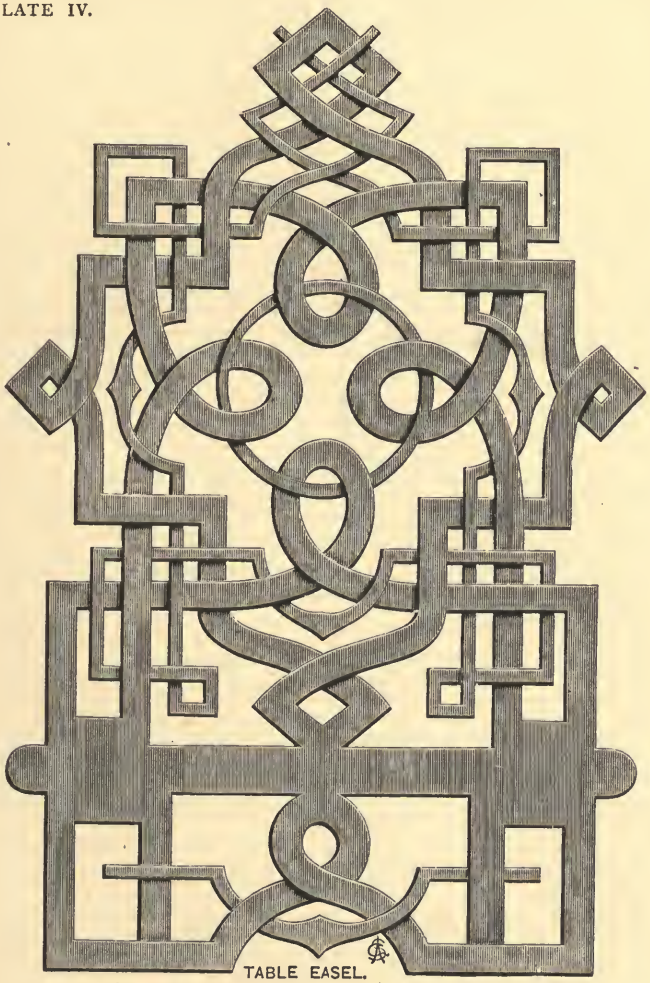


TABLE EASEL.

ground of any of the above-mentioned woods, will be found very effective.

White holly comes occasionally as wide as ten or twelve inches; but it is a very difficult wood to keep in stock, as it both warps and splits, and it is so hard as to be troublesome to plane. Indeed, it cannot be planed perfectly smooth, but must be finished with a scraper; and a skilful cabinet-maker is the only person likely to make a satisfactory job of it. It would be well, when buying it, to get it at places where it is kept planed and ready for use. It costs, when prepared, from ten to fifteen cents per square foot, for thicknesses from one-eighth to one-quarter of an inch.

Maple is fine grained, and sometimes handsomely figured, but is rather hard to work; the saw seeming to drag in working it, in a very tiresome manner. It would be useless to try to cut with a hand-saw a greater thickness than about three-sixteenths of an inch; and that would be very difficult for a design of considerable size. It costs from six to ten cents.

Cherry and mahogany are both excellent for our purposes. They are somewhat similar in color, and work well. Cherry, being a native wood, is the cheaper, costing from five to ten cents. Mahogany is about three times as expensive.

Rosewood can be gotten in thicknesses of a quarter inch and less, at from forty cents down. It is usually seen in veneers, but is occasionally useful for a handsome piece of fret-work, or to contrast with other woods. It is very fragrant also,

and should be oiled and polished, instead of varnished, to bring out this quality.

Red cedar is a beautiful and fragrant native wood, known to us usually in lead-pencils. Its handsome mottles and purple stripes fade on exposure to the light, and even varnish does not protect it long. It is a delightful wood to whittle, but rather hard to work, from a gritty brittleness which causes it to splinter under the tools. It will do for fret-sawing, but is poor for carving. It is also costly.

Satin-wood is another very handsome variety of a yellow tint, with a fine grain, and beautiful markings; and is suitable for all kinds of fret-work, or for panelling in contrast with darker woods. It is delightfully fragrant when being cut; but the fine dust from the saw is said to be so poisonous, that some workmen at the mills object to working it in any quantities. We have not experienced any effects from this cause, and do not think any fears need be felt by the amateur on this account. A satin-wood panel with ornaments of ebony veneer, the whole finely sand-papered and shellacked, is extremely effective, and not so often seen that one is apt to tire of it.

Olive-wood can be gotten in the cities; and, if pieces can be procured which were brought from the Holy Land, it can be put to most appropriate use in making the carved sides for a prayer-book or Bible, or in making crosses, buttons, and other ornaments for personal use. The wood is very handsome, and works well either to saw or carve. The Holy Land wood is

expensive ; and we have paid as high as three dollars per square foot for selected pieces only one-eighth of an inch thick.

Last, but not by any means least, must be mentioned the Spanish cedar, popularly known as cigar-box wood, which is one of the best, as well as the cheapest we can get. At the factories where the boxes are made, it is possible to procure very fine pieces, sometimes with beautiful mottles and curls like the fancy maples, the effect of which when polished, and coated with shellac, is not surpassed by any common wood. Indeed, its appearance is so changed by sandpaper and polish, that it is rarely recognized by those persons who are only familiar with it in its usual rough state ; and it thoroughly well repays the trouble. It is very pleasant and easy to work, and has an odor which to us is very agreeable. It costs, in the usual thickness for cigar-boxes, about ten cents per foot.

When a factory is not accessible, one can buy, for a few cents, empty boxes at the cigar-stores where they are usually glad to get rid of them ; our modern revenue laws not permitting the boxes to be used a second time for the packing of cigars. Insert the blade of a stiff table-knife in the joints of the box, and carefully pry it apart without breaking the wood ; and throw all the pieces into a tub of water, and let them remain an hour or more to thoroughly soak off the paper strips with which the edges are bound. The wood should be dried by standing it up on edge. If the pieces are laid flat, or piled on top of each other, they do not dry rapidly, and are liable to warp.

These directions may seem diffuse for the performance of so simple a thing. But it is a vexatious job to attempt to scrape the paper off while dry, and it is worse to leave it on a piece of work, and then mar the good effect of it by attempting to remove it after sawing; the paste used to fasten the paper strips on cigar-boxes being as tenacious as a dog's bad name.

Pine is sometimes used, and afterwards stained in imitation of hard wood; but it seems hardly worth the trouble when the others can be gotten. Clear pine looks much better shellacked or varnished, the stain not taking well unless so dark as to obscure the figure of the wood.

Veneers.

All the above-mentioned woods, and many more beautiful kinds, can be had in veneers of about a sixteenth or twelfth of an inch in thickness, at a trifling price; and very handsome effects are produced by the contrasts of selected pieces. Initials, monograms, or silhouettes, in white holly on walnut, rosewood, or ebony; or ebony on satin-wood or curled ash, — make very beautiful ornaments. Veneers of white holly or ash can be gotten dyed in various high colors; and those who have travelled in some of the Pullman day-cars may have noticed the effect of those dyed woods used as inlays around the door-casings, &c. Most of these colors are nearly or quite permanent. The purples, however, are not, and possibly the blues. It would be

well to assure one's self of the fact of their stability before using them on a piece of work of any great extent.

If two or more pieces of veneer of different kinds or colors are laid on top of each other, and sawed out at the same time, particularly when the treadle-machine is used, the saw of which cuts exactly at right angles to the surface of the wood, the pieces or figures which are cut out of one will just fit into the other, and can thus be transposed, and the light ones inlaid into the dark, or *vice versa ;* and thus several examples of the same pattern can be done at once. With the hand-saws, this is more difficult to accomplish, and will require considerable experience to make the pieces fit with some accuracy. The effect, however, is so good, that it is worth while trying even without a treadle-machine ; and if a simple design is chosen at first, and the work carefully executed, a fair amount of success may be expected.

The common kinds of veneers cost but a few cents per square foot ; those dyed in high colors are about twenty-five or thirty cents for the same quantity.

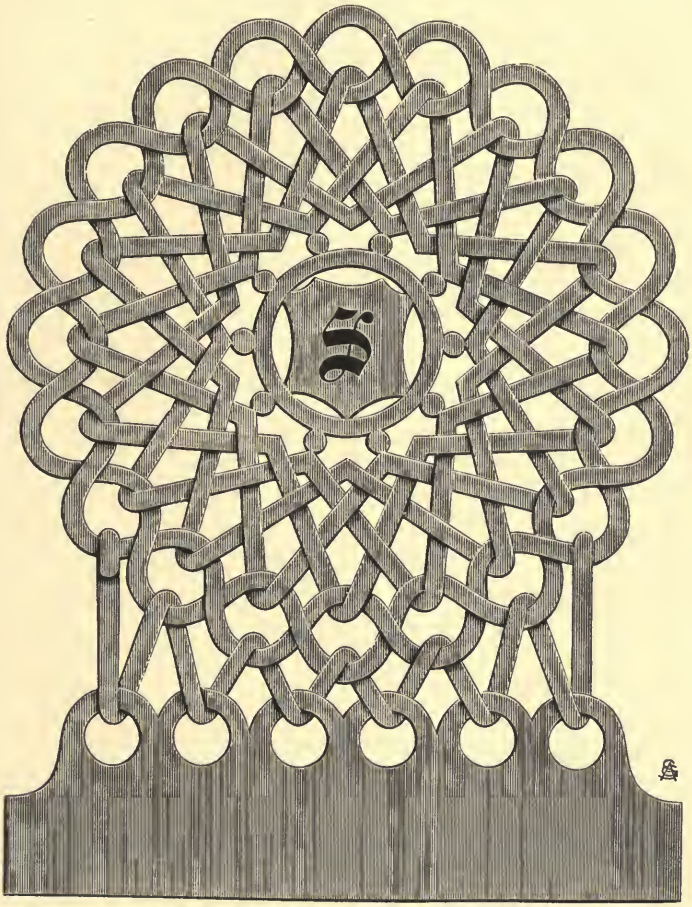
All woods should be well seasoned, or, after spending a good deal of time and trouble in working them, they will be sure to become defaced with cracks or warps, a particularly unpleasant occurrence when one has made a pretty piece of work for a present. The only sure way to prevent this unfortunate result is, to get a quantity of wood, and keep it in the house as long as

possible before using; two or three years is not too much; and, if the house is heated by a furnace in winter, so much the better, the dry air from a register being a great seasoner.

It is said that small pieces of wood may be rapidly seasoned by boiling in clean fresh water for four or five hours; the boiling taking the sap out of the wood, and making it dry and hard. The wood shrinks considerably under this treatment, for which due allowance must be made. We have tried this process in one instance only, on white holly, which was somewhat stained and discolored, in consequence, perhaps, of having been boiled in an iron pot. We would recommend a vessel of tin for light-colored woods.

Thin woods particularly are liable to warp, and it is often necessary to straighten them. This may sometimes be effected by holding them in front of a fire, the convex side exposed to the heat, as close as it is safe to place them; or, damp a place on a board floor, or lay a damp cloth on it, and place the wood over it concave side down, and put a moderate weight on top of it. In either case the work must be watched; and, when the wood has regained its desired condition, it must be removed, and, if it has been damped, it must be put on edge to dry. If left too long, it will of course go the other way.

PLATE V



END FOR BOOK SLIDE.

VII.

Glue, Varnish, Oiling and Polishing.

A GLUE–POT is a necessary accompaniment to our other appliances; and there is such a variety of them kept for sale at the stores that it is easy to provide one. The essential parts are a cup for the glue, and another one larger for water; the glue-cup being placed in the water-vessel, and both set on the stove. This is very necessary to prevent burning. The glue may be put in a china, or glass cup, or tumbler, and heated in any convenient article of tin or iron which can be set over the fire, and is to be applied hot.

In choosing glue, select the lightest colored. It costs a little more than the dark, but is probably purer and stronger. Break it in small bits, put it into the cup, just cover it with cold water, and place it to heat. When in the right condition for use, it should be about as thick as thin molasses, — rather a difficult point to describe, but a little practice will get it right. If too thick it clogs the work; and if too thin and watery it does not possess proper adhesive qualities. If the articles admit of it, it is well to heat the pieces before applying the glue, and use

no more than is necessary to give a thin coating. Press the pieces firmly together, and hold them tight for a few moments with the fingers, or bind them with a string, or use the clamps described elsewhere. The latter is the best method; and the clamps may be left on, if possible, all night.

In glueing veneers, fastening small panels, and the like, apply the hot glue, fix the panel in place, and rub it down with any smooth hard implement, forcing the surplus glue out under the edges. Continue this rubbing till the glue has set, or hardened sufficiently to keep the veneer closely down. All the surplus glue which runs over the edges, must be removed either by scraping away after it hardens, or with a cloth moistened with warm water while it is yet soft. This latter method roughs up the surface of the wood, and is not always admissible.

Glued articles, when exposed to changes of temperature, are apt to draw apart; and it is well, when the nature of the work permits, after glueing on the ornaments, to drill a hole through them from the back, but not so deep as to show on the exterior, and put in a small peg of hard wood well covered with glue. Work so fastened will stand almost any thing. Of course, the wood must be thicker than veneer for this treatment.

Any good varnish may be used; but the most convenient will probably be found to be that made of shellac dissolved in alcohol. This is readily made at home, of any desired quantity and color; and for this purpose procure a small wide-mouthed

bottle (two-ounce is large enough for small work), and fill it two-thirds full of gum shellac broken in bits. Cover with strong alcohol, and cork it up, shaking occasionally, and, if you are in a hurry, placing the bottle in a warm place. It will dissolve in twenty-four hours or so, and may then be thinned by the addition of more alcohol if necessary. It is better to use it thin, and put on several coats, than to try and get the effect with one thick one. If you are doing a nice job, like a box-cover, or a panel, after putting on several coats, you can rub it down with a piece of very fine sand or emery paper, and finish with one more thin coat. This takes out all the brush-marks, and leaves a perfectly flat and even polished surface.

The alcohol used to dissolve shellac must be strong and pure, what druggists call alcohol of 95 per cent. If it is thinned or watered, it will not dissolve the gum.

Use a small, flat brush; and, when through, wash the brush by pouring on it a few drops of alcohol, and wiping dry.

Shellac may also be applied with a pad of cotton done up in a soft linen rag, and laid on with a quick circular movement, and the rag kept moistened with alcohol applied very carefully, drop by drop. If too much alcohol is used, it re-dissolves the gum, and spoils the effect; and yet the gum must not be allowed to get so dry as to be streaky. Experience and good judgment alone will make a success of this method; but for a flat panel nothing short of real French polishing will produce so good an effect. On irregular surfaces, the brush must be used of neces-

sity. Shellac dries so rapidly that the difficulty in this process is to do it quickly enough. There are two kinds of shellac,— the dark, which is of a mahogany color, and is suitable for all dark woods; and the bleached, which is of a light creamy tint, and is excellent on light woods and dyed veneers.

Many pieces of work look better with a dead oiled surface than with a polished one; and for this purpose nothing is better than raw linseed-oil applied with a soft rag, and well rubbed in, and this repeated as often as is necessary to get a good finish.

Polishing wood is a high art, in which great success is only attainable by the most cunning and crafty workmen; but this should not discourage the careful and ambitious amateur from making the attempt, in special cases when a high finish is desirable, with a confident prospect of measurable success.

Prepare the wood for polishing by using the finest sand or glass paper, and rubbing it till all tool marks and scratches are absolutely obliterated.

French polish is purchased at drug or art stores, of two kinds, light and dark, for woods of those respective shades.

To apply it, make a pad of a small tuft of cotton-wool folded in a soft old linen rag, the folds of the rag at the back serving for a handle. Cotton cloth will do also, but the linen is freer from lint.

Moisten the bunch of cotton with the polish, and place it in the folds of the rag, squeezing it slightly to force the polish to

soak through, and apply to the outside of the rag a drop or two of raw linseed-oil. Sweet-oil may be used, but linseed dries harder, and gives a more durable surface. If the oil is applied to the pad by dipping in the bottle a small broom-straw, and putting on only the drop which adheres to it, too much will not be used; the object of the oil being merely to make the pad slip easily over the surface of the wood, and as little should be used as will barely accomplish this result.

With the pad thus charged, rub it on the wood with a circular motion till it is all covered, charging the cotton occasionally with the polish, and the rag with the oil.

The first coat will sink into the wood, and produce but little effect. Allow it to dry; and repeat the operation as many times as may be necessary to produce a surface which will reflect light like a mirror, and in which you can see your face. Two or three applications will ordinarily produce this result; an open porous wood, requiring more than a hard fine-grained one.

If greasy white streaks show themselves, it is evidence that too much oil is used, and they must be gently rubbed out without oiling the pad.

This process is of course only suitable for flat surfaces, panels, and the like; though wood which is to be used for plain fret-sawing may be partially prepared by receiving one or two coats before sawing, and a finishing one afterwards, it being very difficult otherwise to polish sawed work.

VIII.

Copying and Transferring Patterns.

SELECT one of the designs given here ; and, if some little knowledge of drawing is possessed, the pattern may be copied off on a separate piece of paper, and enlarged to any desired dimensions.

A common method of enlarging designs is given in fig. 14, which is a leaf of the horse-chestnut, of which it is desired to make a copy twice the size of the original. Draw over the pattern any number of straight lines at equal distances apart, and intersect them at right angles by other lines at similar distances. A convenient distance apart for the lines would be one inch, or some even part of an inch. Draw on another piece of paper the squares as many times larger or smaller, as it is desired to enlarge or reduce the figure ; and

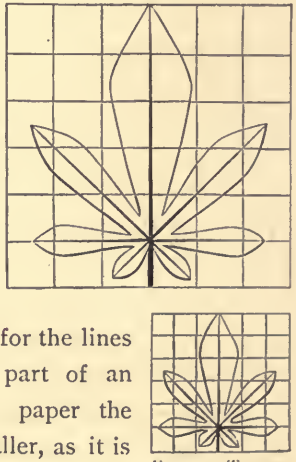
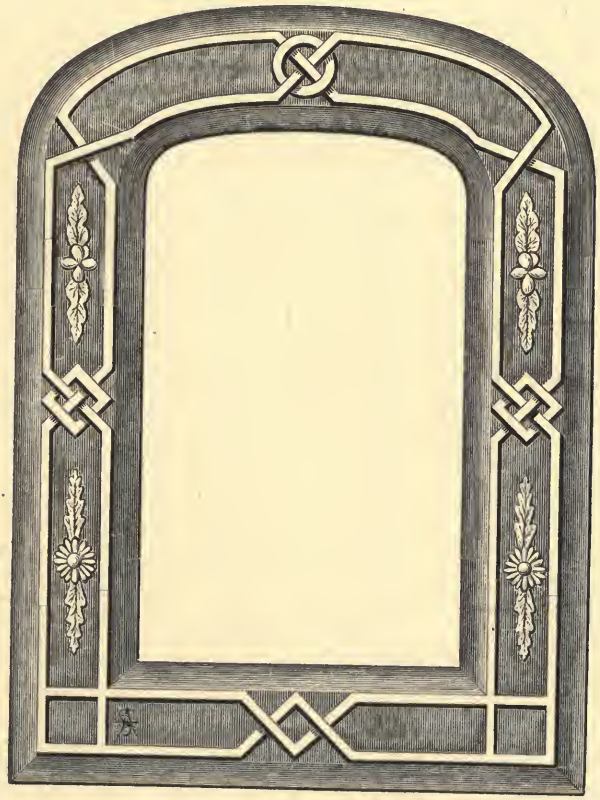


FIG. 14. TRANSFERRING PATTERNS.

PLATE VI.



PICTURE FRAME.

copy by hand the pattern, putting those parts which fall in any particular square of the original in the corresponding square of the second figure. By this simple method any sort of designs may be made available to suit our particular needs, and a very slight knowledge of drawing will be all that is necessary.

A pair of dividers, or compasses, and a parallel ruler, will be found very useful for many purposes in doing nice work, besides their help in copying or transferring patterns.

Having gotten the pattern satisfactorily arranged, the next process is to transfer it to the wood. This may be done in the same way if the wood is light colored enough to take pencil-marks. Or the pattern may be carefully cut out with the sharp point of a knife, and used as a stencil, from which to make a tracing on the wood. Or what is called transfer-paper may be laid on the wood, the pattern over it, and the lines of the design marked over with a hard, sharp point of any kind which will leave an impression from the transfer-paper. Or the pattern may be laid down, and the lines pricked through with a pin-point, and the pin-marks afterwards joined by pencil-marks.

These methods all preserve the pattern for future use; but as printed patterns cost but a trifle, and it may not be worth while always to take this trouble, the pattern itself may be gummed on to the wood, or, better still, fastened with tacks, and the whole thing sawed out together. What are known

as drawing-tacks are most convenient for this purpose, though the common kind will answer nearly as well. When tacks are used, they should be, as far as possible, driven into the waste wood, so that the holes left by them may not mar the finished work.

IX.

How to use the Saw.

BEFORE commencing on real work, it would be well for the beginner to make a few experiments on pieces of suitable material, to get somewhat familiar with the motion of the saw, and the handling of the other tools.

Take the saw-frame, and fix in a saw-blade, putting the teeth outward and downward. Clamp the lower end of the saw first. Put the upper end of the saw-frame against some fixed object, and spring it slightly while the other end of the blade is being secured by the other clamp. This will bring a strain on the blade so that when picked by the finger it will twang like a guitar-string; and is necessary, because the blade has no stiffness of itself. The clamps need to be tightly secured, or the saw-blade will occasionally slip out.

The wood is laid on the table or saw-horse, the part to be worked on projecting far enough over the edge to allow the saw to have free movement. Commence on the outer edge, and follow the lines around, working the saw up and down with a quick, energetic motion of the right hand; turning the work, and

feeding it to the saw, with the left. After finishing the outline (or before, as may be convenient), drill holes through all the spaces within, which are to be cut out. Unclamp the upper end of the saw-blade, put it through one of the holes, and again clamp it fast. Saw out this part, and so on successively till the pattern is complete. If the pattern has been gummed on, damp the waste paper slightly, scrape it off, or lay it on a sheet of sand-paper, and rub it off.

Unless great care has been taken, and the lines of the pattern most accurately followed, it will be found that there are little ugly irregularities in the sawing, which seriously interfere with its symmetrical appearance. These are to be carefully removed with the little files; and, when one side of the wood does not quite agree with the same parts on the other side, the files are to be used till a satisfactory regularity and evenness is obtained. The curves are all to be made regular and even, the points sharp and true, and the angles clean and open.

This careful after-finish should be regarded as very important. The work often sold in the shops is left just in the condition in which it came from the saw, with the edges rough and irregular, and made worse by the swelling action of the moist varnish upon the exposed wood fibres. If we want to produce work which is to excel all this poor stuff, we can easily accomplish our desire by the careful finish recommended; and this is really the best evidence of skilled labor.

There are many little convenient methods of work which are

only learned by experience, and each one is apt to find his own way easiest, even if not the simplest; but some little points will be suggested which may save the tyro time and trouble.

In sawing into an angle of any acuteness, it will be found that the saw cannot be readily turned without destroying the sharpness of the angle. In such a case, having cut up one side into the angle, back the saw out a little way, and cut across the waste wood to the other line, and follow that up till it meets the first. Or it sometimes answers to draw the saw entirely out of the angle, turn it around, and put it in backwards, and then cut from the angle outwards. Occasionally it is more convenient to saw past the angle, and leave it till there is no wood outside to prevent the free action of the saw.

In turning a square corner, or an angle of 90°, saw up to the point, and then run the saw up and down a few times without moving the wood, till a little space is cut away in which the saw-blade can be turned ready to follow down the new line. A similar process will carry the saw around a projecting point, taking care in both cases that the space cut away be on the side of the line within the waste wood. In all cases it is recommended to follow the line with the saw with as great accuracy as possible, as it is less tedious to do so than to expend the time afterwards finishing with the file.

In using the smaller patterns of hand-saws in cutting out the inside portions of the work, it will frequently be found that the back of the saw-frame interferes, and it may be necessary to put

the saw into the frame with the teeth inward, and then saw towards you from in, out; or the saw may be put in with the teeth sideways; and you will find that, changing the saw around in this way, you can do much larger pieces of work with the same tool than would otherwise be possible.

Feed the wood to the saw slowly, and be careful to hold the saw as nearly perpendicular as possible.

The smaller saw-frames are best worked as one naturally uses any saw, with the hand above the work; the longer ones, figs. 2 and 3, are operated by the hand below, the frames, when long enough resting on the arm. In this latter case it is recommended to have the work on a higher level than with the other saws, either by using a high table or a low seat. The exact adjustment will, of course, depend upon each individual's needs, but the work should be so arranged that stooping over it will not be necessary.

X.

How to use the Carving-Tools.

AFTER the sawing is finished, the carving-tools may be brought into requisition for further embellishment. With the gouges the leaves and scroll-work may be hollowed out till an appearance of relief is attained. The veins of the leaves may be put in with a few strokes of the parting or veining tool; or the more prominent one, the midrib of large leaves, may be left in relief, and the adjoining wood slightly cut away with the flat or firmer chisels. Stems, or other parts of the design which cross or intersect each other, may be made to seem to pass behind one another by appropriately cutting away and thus depressing the adjacent wood; and fruit and berries may be given their rounded forms. The scroll-work carvings on the many articles of household furniture which are so abundant will give hints of how these effects are gained; and a few moments' careful observation in a picture or furniture store will add very much to the value of any written instructions.

The work to be carved should be securely fixed by one of the methods previously noted, and the carving-tools used with both

hands, the palm of the right one on the head of the tool, and the side of the left hand resting on the work, the thumb and fingers turned up, and supporting the blade, and acting as a guide to direct the push of the right. In using a mallet for cutting away a large quantity of surplus wood, the tool is firmly grasped by the left hand, and light blows struck upon its head with the right. The mallet should be of wood, so as not to spread or roughen the head of the tool, which would make it unpleasant afterwards to use by hand.

In all carving, the work should be done slowly and with care. If a part is accidentally cut away which should have been left in relief, it is impossible to repair the damage: hence, when it is possible, the direction of the cut should be away from, rather than towards, the elevated parts; but when the grain of the wood makes the reverse necessary, cut carefully, and stop a little short of the line, and finish up afterwards with still greater care.

As a general rule cut with the grain of the wood; though if it is found that the grain dips a little, and is taking the tool deeper than is desired, the work must be turned around, and the cut made in the opposite direction. Sometimes the work can be advantageously cut across the grain; but the tools do not leave the work in quite as good condition as in the former case, and a little more finish is required afterwards.

After the carving is finished, and not before, the surface of the work may be smoothed with fine sand-paper, assisted by the

riffler or bent files in the depressions. It is well to bear this hint in mind, and not use sand-paper till the carving is entirely finished: otherwise the fine grains of sand are apt to injure the edges of the tools.

It is also important that the sand-paper should be so applied that the edges of the work are left sharp, and not rounded off; a result which more than any thing else destroys the artistic effect of the work.

In using sand-paper on fret-work, and sometimes on the higher surfaces of carved work, or for bringing an uneven surface to a perfectly flat one, the best way is to lay a whole sheet of the paper on a flat board, fastening the edges down with glue or tacks, and then rub the work on it, and always with, or in the direction of, the grain of the wood.

Finally, the work may be treated with oil or varnish, as before mentioned.

XI.

Description of Plates.

IN a work of this character, intended for beginners, it has been thought well to give a brief description of the plates, and some hints as to the manner of working them; though the general remarks previously made will, it is hoped, be nearly sufficient.

Of course these designs are given more as hints than as examples to be accurately followed: still they are practical working models, and will look very much better in wood than they do here on paper. This last remark is true of all paper patterns: they are very much handsomer when cut out.

If the smallest sized handsaw is the implement used, it will not work to advantage on wood much larger than that required for the largest design here given; but with the larger styles of saws, or with a machine, these patterns may be enlarged to any desired size.

Plate 1, of carving-tools, is sufficiently described in the article on Tools and Accessories for Carving.

Plate No. 2 is one-half of a bracket intended for a corner. The other half is a repetition of this, except that the straight

PLATE VII.

WALL POCKET.

side on the left is to be made as much wider than this one, as the thickness of the wood of which it is made, to allow for the lap of the two parts in putting together. A little shelf goes between them, fastened to the crossbar; and the whole may be put together with small nails like those used in cigar-boxes, or with screws, which is better, as it allows the bracket to be taken apart when necessary.

Take a piece of wood of the necessary size, and by some of the methods before described, transfer the design to the wood. Commence by cutting away all the waste wood outside of the pattern. Of course it is not essential that this should be the first step; but, if the waste wood is gotten rid of, it will allow the freer movement of the saw in cutting the rest. Drill holes through all the spaces, and cut them all out successively.

Finish with files and sand-paper, and shellac or oil.

Plate No. 3 is the back piece of an ordinary wall-bracket, currants and leaves. The front piece, which supports the shelf, is to be exactly one-half of this back piece. With a machine-saw both pieces may be sawed out at once. The shelf is made just large enough to cover the supports; and it should have an irregular outline, something like what carpenters call an ogee. The whole work may be left flat like ordinary fret-work, or the veins of the leaves may be carved into relief by cutting away the adjacent wood, or, in a small object like this, they may be done pretty well with knife and files. The stems may be more or less rounded, and the berries also.

If the work is left flat, the veins may be sawed.

Plate No. 4 is a table easel, and hardly needs much comment. The piece upon which a book or picture is to rest is to be glued or screwed to the bar on the lower half; or two brass nails are to be inserted for the same purpose. A small piece of wood is to be glued near the top on the back, to which the leg which supports the easel on the table is to be fastened with a hinge.

The pattern is to be entirely sawed out, and the carving done as shown to give the appearance of ribbons passing in and out This carving is very easily done; and, as the drawing shows, adds very greatly to the attractiveness of the finished work. Use a flat chisel, and make the first cut nearly perpendicular, and from a sixteenth to an eighth of an inch in depth, according to the thickness of the wood, and size of the work. The second cut should be from the outside in towards the first, so that the ribbon will look as if it were bent under the first. Be careful, in cutting with the grain of the wood, not to go too deep and split it clear through; but, if such an accident occurs, take a little glue on the end of a knife-blade, and push it into the cleft from the back, and hold it tight till it sets.

Plate No. 5 is one end of a table book-rack, or book-slide as they are sometimes called. By lengthening the lower part into little legs, and putting a support to the back, it would also do for an easel; and the circular part alone would make a table-mat for a vase. Leaving out the centre-piece, and perhaps the inner row of lacing, it might make a frame for a medallion, or small round picture.

For a book-rack it may be sawed out in walnut thick enough to make a substantial article, or it may be done in thin holly or other wood, and glued on to a thicker piece of dark wood. In the latter case, both sides may be sawed at once. These ends are to be fastened with hinges to a strip of wood of the same width (see fig. 15), and rather more than twice as long as their united length, so that when they are shut down they will lie flat. The hinges and screws should be countersunk, so that the bindings of books will not be injured. Any initial or monogram may be put in the centre, and the shield may be of a different colored wood. The bands of the lace or basket work are all to be carved to give them the appearance of passing in and out, as before explained.

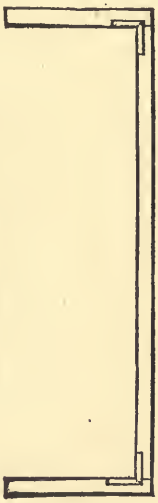


Fig. 15. Attachment of Ends to Frame.

Plate No. 6 is a design for a picture-frame, which may be modified in many ways by simply changing the arrangement of the border and panels.

The foundation is of walnut or other dark wood, the ornamental edging and carvings are of white holly, and the panels under the carvings may be of any contrasting veneer.

Saw out first the walnut of one piece. The edges outside of the line of ornaments would be better bevelled off as indicated. The holly edge, if the frame is small, may be of a single piece also ; but it is safer, perhaps, and rather less trouble, to make it

of pieces, say four parts, top, bottom, and two sides; joining them where the lines cross, and make a natural break. After sawing and fitting the ends close and true, glue it in place upon the walnut, and scrape off all surplus glue. Then with a flat chisel or knife-blade, carve the lines so as to make them pass in and out, as in the other examples.

Veneer for the panels should contrast well in color with both the walnut and holly. Something of a tint between the two, satin-wood, cedar, curled maple, or some of the stained holly, would look well; and each piece is to be cut out exactly the size to fill the space, and glued in.

White holly is the best wood for the little carvings. The upper ones are meant for pansies, and the others for the daisy, or whiteweed. If you will look at the flowers themselves, you will see at once how the petals are laid, one over or against the next; and it is only necessary to imitate the arrangement to the best of your ability to get as natural and truthful an effect as possible. The leaves are very slightly carved with a small gouge, leaving the midrib prominent, and sloping the veining down and away from it.

If these little ornaments do not stick well, as is the case sometimes with amateurs' glueing, see directions before given for fastening them with pegs from the back.

A recess at the back is necessary to hold the glass and picture. This is made by glueing on strips a quarter of an inch or so square, all around far enough from the inner edge of the walnut piece to hold the glass securely.

A mat of gilt paper will greatly improve its appearance.

Plate No. 7 is a wall-pocket which may be made large enough for newspapers, or small enough for letters and cards.

The back is of one piece. The wild convolvulus leaves and vine border, are to be carved to give the relief shown.

The line next inside the vine-stem indicates the size and shape of the pocket-flap. This is to have a panel cut out, and some contrasting wood substituted. A veneer glued to a piece of thin pine, larger than the orifice, will answer; and this may, in turn, be glued to the flap. A large monogram, or the figures given, may be cut out of veneer or thin wood, and glued on the panel; and, if the selection of woods has been judiciously made, the effect will be very satisfactory.

The flap should be attached to the back by morocco or other thin leather, either glued, or fastened with bright-headed nails.

If the flap is made of wood a quarter of an inch or more in thickness, both its inner and outer edges will look better if they are bevelled off, and a moulding made with a small gouge. On thin stuff this would not be necessary.

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